

# THE PRAIRIE FARMER'S VEGETABLE GARDEN

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AND

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DOMINION EXPERIMENTAL FARMS BRANCH  
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## DOMINION EXPERIMENTAL FARMS BRANCH

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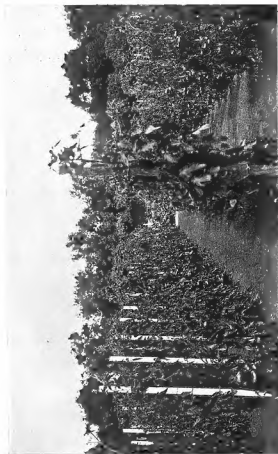
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The time of ripening can be advanced and production of ripe fruit increased by staking and pruning tomatoes. On the left, stakes are used for tying up the plants, and on the right, none.

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*Dominion Experimental Farm, Brandon, Manitoba*

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## INTRODUCTION

Speaking broadly, the farm should supply the farm table. Shall this supply be limited to the essentials for a bare existence or shall it reach the standard of what we call "good living"?

The answer depends upon the part played therein by the farm garden.

What returns may we expect from such a garden? The greatest is one hard to measure in dollars and cents, namely, the furnishing of an attractive and healthful variety in the daily fare.

Next, we save the money otherwise spent for a limited, irregular and inferior purchased supply of garden products. Our present knowledge of home canning, curing and storing makes the products of our farm garden available at all seasons.

Thirdly, many prairie farms are so situated as to command a ready and profitable sale for surplus garden crops.

The soil and climate of Western Canada are particularly well suited to many kinds of vegetables, which reach an unsurpassed excellence.

The labour involved in keeping a good farm garden is not great, is not heavy, does not demand special equipment and can mostly be done in spare time.

The garden on the farm is, therefore, possible, profitable and interesting. In the following pages suggestions based upon results obtained on the Experimental Farm are given for the guidance of the prairie farmer starting his farm garden.

## CHOICE OF LOCATION AND SOIL

In locating a vegetable garden the chief consideration is convenience to house and to working headquarters. Therefore it must be close to the home buildings if it is to be of most use. The same windbreaks that protect the farm buildings, and the same fences that regulate stock around the buildings, can serve these purposes for the garden if it is conveniently situated.

In regard to choice of soil there is usually little use in entering into a discussion: the soil that happens to be convenient to the farm buildings must be used whether it is the most suitable or not. Fortunately nearly all the soil of the farm lands of the Prairie Provinces is good garden soil. The black loams of the eastern part of the prairies and the northern park districts and the

chocolate loam of the drier sections are good for vegetable growing. They contain an abundance of plant food, and are able to retain moisture well and have enough of the sharper sandy particles to be easily worked and to be suitable for vegetable growing. The heavier clay soils and the other extreme, the very light sandy soils, are the least suitable for most varieties of vegetables. Therefore, when a new site for home buildings is being considered or where there is variation of soil around an existing home, the choice of soil may well be considered as a factor in determining the location. Good drainage and freedom from alkali should also be made sure of before locating the farm garden.

### SHELTER-BELTS AND PROTECTION

One of the prime essentials in successful gardening on the prairies is shelter from wind; especially is this true if the garden is to be used for fruits as well as for vegetables. The sweeping winds dry the moisture out of the surface soil,



Shelter from wind is the first step to success in prairie gardening.

Note: (a) High trees in background for general windbreak. (b) Dense hedge around garden.

making germination of the seed uneven or a total failure, and rob the plants of the moisture necessary for growth. The wind beats about the plants and does a great deal of injury or even causes the soil to drift, exposing seeds and destroying growth. It blows the snow off in the winter, removing protection from any perennial vegetables and from fruit trees and bushes, and reduces the moisture supply in the spring. The wind might well be placed as the first enemy of successful gardening on the prairie and its obstruction as the first step to success. Shelter from wind will be most effective if two distinct forms are employed: first high trees, not too closely set, to check the general force of the wind over the whole vicinity, and to stop the drift of snow at a little distance from the buildings; and second, low, dense shrubs or hedges around the garden, or at least on exposed sides, to stop any sweep of wind along the ground that may get by the more distant general windbreak. Large trees close to the vegetable garden are objectionable, as the tops shade the vegetables

and the roots rob them of plant food and moisture. Furthermore, high trees are often quite open at the bottom so that the wind sweeps along the ground. Shrubs or hedges do not cast shade or spread roots so far, and are dense at the bottom, so are more suitable as immediate neighbours of the vegetables, though even they should be ten or twelve feet away. Hence the above-described combination of shelters is most effective.

The garden deserves to be properly fenced. Probably as much discouragement comes to those who have expended work on a garden, through the depredations of wandering live stock as from any other cause. The length of fencing required is not great, so that the outlay is not large. It should be a good woven fence that is put up; one that will stop pigs and smaller stock; with a gate that will swing on hinges and stay shut when closed, instead of a few loose strands of wire across the opening.

### GENERAL ARRANGEMENTS

The prairie garden should be arranged so as to allow as much horse labour as possible. The average masculine resident of the prairie farm is not particularly in love with the hoe, and this sort of labour should not be expected of the ladies; so the only satisfactory solution for all concerned is to pass on as much as possible to "friend horse." This can best be done if long rows are used running continuously or end-on-end for the whole length of the garden. Wide headlands at each end will allow for turning room, and the cultivator or plough can then be drawn from end to end without difficulty. As space is plentiful on the farm, the rows should be wide enough apart for horse-tillage implements to be used, i.e., two and one-half or three feet. With many kinds of vegetables the greatest yields can be obtained with rows as closely spaced as a foot or even ten inches, but in the farmer's garden, yield per acre is less important than yield per hour of human labour so wide rows and horse cultivation are best.

Small, square, raised beds of vegetables such as are sometimes seen are inherited ideas from our fathers or grandfathers who gardened on limited areas in districts with heavy rainfall, with a water-saturated soil. The square beds with narrow paths were convenient for hand labour, and raising the beds kept them up out of the wet, so that the plants had a better chance of drainage. Our conditions are entirely different. Long rows are better, as already shown, and flat culture an improvement over raised beds. We farm in a dry climate and should allow the plants to get down to the moisture and out of the wind as much as possible. With the exception of the banking up of the soil to blanch celery or leeks, there is no vegetable grown in the West which is not better planted on the flat earth rather than raised on ridges or beds.

### GENERAL CULTIVATION

With a garden laid out as above described, the preparatory cultivation can be done with horses and ordinary farm implements. Perennial vegetables, such as rhubarb or asparagus, or fruit bushes, should be kept at one side of the garden so that the part which must be prepared each year may be handled with horses as a small field would be. Whether fall ploughing or spring ploughing is better is a matter for local experience to determine. In some places the one will give better results and in some places the other. At Brandon, fall ploughing has been decidedly the best.

It need scarcely be said that a garden needs thorough cultivation. Practically all garden seeds need a soil in fine tilth for germination. If the soil is at all lumpy the disc harrow may be used, but so far as possible the ploughing

should be done when the soil is neither so wet nor so dry as to turn up in lumps. Good garden soil can usually be worked up satisfactorily with the drag harrow. The use of this implement should be repeated till the desired fine tilth is reached. For a few vegetables requiring particularly fine conditions, hand-raking may be necessary. Besides preparing the seed-bed, cultivation must control weeds. The garden that becomes overrun with weeds, and especially with grass, is useless. It is often easier to move the garden under such conditions than to clean it. Brome grass, while useful in its place, is a



Wheel Hoe. With one of these implements a man can cultivate the land four or five times as fast as with an ordinary hoe and with less labour.

pest in the garden. It should never be sown near gardens, fruit plantations or cultivated windbreaks but should be kept separated from such places by areas of native sod or grain crop. The borders of the garden may be sown with non-spreading grasses such as timothy or western rye grass, or kept clean by repeated cultivation. Weeds should never be allowed to go to seed in or near the garden. If some escape cultivation they should be hand-pulled and burned.

Most of the intertillage in a garden laid out as described can be done with a horse and scuffer. If it is not desired to take the horse in, or if a steady-going horse is not available, the wheel hoe, run by hand, is a valuable implement to have. With one of these a man can cultivate the land four or five times as fast as he can with an ordinary hoe, and with less labour. With a little practice he can cultivate right up to the row without injury to the plants.

#### THE HOTBED

For a few of the vegetables that require an early start, the use of a hotbed gives the most satisfactory results. The following directions for making a hotbed are quoted from a pamphlet by Mr. W. T. Macoun, Dominion Horticulturist:—



"In making a hotbed, the first step is to choose a good situation on the south side of a building, wall, or close board fence where the cold winds from the north will be broken and all the sunshine possible will be obtained. After deciding on the site, the frame should be made. The simplest frame is one made out of two-inch planks. It should be so constructed that it may be raised, as this may be necessary if the plants get too close to the glass. The frame should be at least six inches higher at the back than at the front, in order that the rain will run off readily and that the plants get more sunshine. The sashes generally used are three by six feet. A hotbed may be made either above or below ground. If above ground, it may be made in any situation



Hotbed with end exposed to show manure below and banked against sides.

where the water is not likely to lie. The one below ground is usually preferable if it can be made where the land is high and well drained. To make the latter, the soil should be taken out to the depth of about eighteen inches or more and about three feet wider than the frame so that there will be room for banking. The banking is an important part of the construction of a hotbed as the conservation of heat in the bed depends largely upon it. It will be readily seen that much labour will be saved by doing the necessary excavation for the frame in the autumn when there is no frost in the ground. Horse manure is the best to use in making the hotbed and it should be quite fresh, not cold and rotten, and not already heated. It should be piled near where the hotbed is to be, and when it begins to heat it should be turned to make it of more uniform consistency. Five or six days after turning, it should be quite hot and ready for use. The bed is started from one end and the manure shaken from a fork so that the long and short manure will be well mixed. When one layer is made it should be tramped well and then another started, and so on, tramping each layer until the manure is the depth required. The depth will depend on when the bed is made. If made early, the manure should be from two to two and a half feet

in depth, but if made during the latter part of March when the weather is not very cold, about a foot of manure will suffice. After the manure has been put in, the frame should be placed on and then about four to six inches more manure put in and banked well around the sides of the frame, both inside and out. Outside, the manure should be banked to the top of the frame and from twelve to fifteen inches in width. The bed is now ready for the lights and the frame should be so constructed that these will fit snugly. Shelters made of one-inch lumber the same size as the sashes are useful for covering them, as they help to conserve the heat in cold weather. In two or three days the sash should be removed, the manure given a tramp all over, making it level where necessary, and then the soil put on. To get the best results the soil should be prepared the previous autumn and left in a pile over winter. It should be rich and of such a character that it will not bake. The soil should be from five to six inches in depth over the manure, and it is better to have it a little deep than too shallow. The soil when it is put in should come near the top of the frame at the lower side, as the manure will sink considerably, and the nearer the plants are to the glass later on the stockier they will be. In five or six days the hotbed will be ready for the seed, but it is necessary to wait until the manure has cooled a little and the temperature has fallen to between 80 degrees Fahrenheit and 90 degrees Fahrenheit. During this time when it is hottest, some of the heat may be allowed to escape by raising the sashes a little every day. One should not be in a hurry to sow the seed, for should the temperature run too high, the results will not be satisfactory. When the bed has reached the right temperature, the soil should be spaded over a couple of times and the surface levelled and made fine with the rake. The bed is now ready for sowing. The seed is usually sown in rows about four inches apart and about the same depth as outside plantings. When the young plants come up, the frame should be kept sufficiently aired, by raising the back of the sash, to prevent the plants from getting spindly or weakly, when they are apt to damp off. Flats or boxes 12 by 18 inches in size containing three to four inches of soil are convenient for handling the plants. There should be half-inch holes in the bottoms. Where these are used, it is not necessary to put much soil over the manure, the flats or boxes being set in the frame. Sometimes if the manure is too hot, the roots of the plants are injured in the flats and if there is danger of this they should be set on laths to leave an air space between the flat and the manure. Care should be taken to prevent the plants being chilled or frozen. The soil must be watered when necessary, care being taken not to overdo this as the plants would then be likely to damp off. As soon as the plants are large enough, they are pricked out into another sash or frame."

#### GENERAL INSECT CONTROL

There are some general practices which may be observed to reduce the danger of the attacks of insects. The most important of these is to keep the garden clear of all material which might serve as winter shelter for insects. Weeds should be kept down. If grass is grown along the headland, it should be mown and used, not allowed to go to seed or stand over winter. Waste, such as tops of vegetables, should be piled and burned. As much as possible of the ground should be kept bare and free from unnecessary growth.

Deep fall ploughing, to expose to the frost insects that bury themselves in the soil for the winter, or to bury below air supply those that are sheltering in rubbish on the surface, is an excellent general precaution.

Most insects affecting garden crops attack only one crop or plant family. A few of the most important of these are discussed under the heading of the crop attacked. The cutworm, however, is less discriminating in its taste and is a general danger. The methods mentioned already whereby the land is kept clear of rubbish and weed growth are the most effective means of preventing cutworm attacks. Where an attack does occur the use of poisoned bait is recommended. The Dominion Entomologist, Mr. Arthur Gibson, recommends the following for this purpose —

#### POISONED BRAN MIXTURE FOR CUTWORMS

Bran, 20 pounds.	Paris green, $\frac{1}{2}$ pound.
Molasses, 1 quart.	Water, 2 to 3 gallons.

"Mix the bran and Paris green thoroughly in a wash tub, while dry. Dissolve the molasses in the water and wet the bran and poison with the same stirring well, so as to dampen the bran thoroughly. A simple formula for small gardens is one quart of bran, one teaspoonful of Paris green and one tablespoonful of molasses, with sufficient water to moisten the bran. Shorts or middlings in place of bran can also be used.

"In gardens containing rows of vegetables, the mixture should be scattered thinly along the rows on either side, as soon as cutworm injury is noticed. Flowering plants may be protected by placing a small quantity of the poisoned bran around but not touching each plant. It is important that the poisoned bran be scattered after sundown so that it will be in the very best condition to attract the cutworms when they come out to feed at night.

"In small gardens, as soon as cutworm injury is noticed, the culprits can, as a rule, be easily located in the soil about an inch or so beneath the surface and within a radius of a few inches of the plant, and destroyed by hand."

#### ROTATION

The garden should be run in a rotation if best results are to be obtained. Where rainfall is light and spare plentiful good results will be obtained from summer fallowing the land every second or third year. When this is done one-half or one third of the garden is left unseeded each season. This portion is handled with farm tillage implements and is kept perfectly clean all the year. It is then in an ideal condition for garden seeds the next year. On the heavier soils and where a fair amount of moisture is available no advantage from summer-fallowing will be gained, in fact the summer-fallowed land may be found to be colder and slower in the spring. The use of wide rows with thorough cultivation obviates the need of summer fallow in any but the driest districts as the conservation of moisture under these conditions is good.

The garden crops should be rotated so that the soil gets a change from one type to another. Peas and beans are different in their effect on the soil from the deep-rooted beets, carrots, etc. Wide-spreading vines, like melons and cucumbers are a change from closely planted crops. Tomatoes and corn are also distinct types from the common vegetables. Thus, these varying kinds offer ample opportunity for change of crops on each part of the garden.

#### MANURE

It will be found advantageous to apply a dressing of barnyard manure to about one-half or one third of the garden each year. This is usually available and convenient to the garden on the prairie farm. It should be thoroughly

rotted before applying. Coarse straw manure is of doubtful value in the garden. It opens and dries out the soil and is likely to bring in weed seeds. Manure that has been piled for at least a year is heavy, so full of moisture, with the straw rotted and the weed seeds killed is the best for the garden. It should be applied evenly over the surface of the land and ploughed in. Such manure adds fertility at low cost, stimulates bacteria action in the soil and keeps the soil from getting either too solid and sticky if it is heavy, or too powdery and inclined to blow if it is light.

The prairie farm garden will rarely, if ever, require the application of commercial fertilizers. The soil is well stored with the elements of plant food. Under special circumstances some benefit might be derived from the use of special fertilizers, but if farmyard manure and good cultivation are made use of the owner of the home garden on the prairie may safely ignore commercial fertilizers.

### WHAT TO GROW AND HOW MUCH

In the paragraphs which follow are discussed most of the common vegetables that can be grown in Western Canada, but it is not suggested that any one farm garden should contain all or even most of them. Each family should select those things it at appeal to its taste. Incidentally in making such selection consideration should be given to the use of vegetables at different seasons and to their use as different types of food. Unless for some very special and unusual reason every vegetable garden should include potatoes. The potato is the most widely acceptable of all vegetables. It appears on most tables every day in the year and on many three times a day. It succeeds anywhere in Canada. To have to buy potatoes or go without them on the farm surely indicates a weakness in management. With the potato might be included at least one other of the solid food vegetables commonly eaten with potatoes and meat such as carrots, parsnips, turnips, etc. and as these are easily grown and stored, many will wish to have two or three kinds.

Then something in the way of green food that can be used in winter should be grown. The cabbage is probably the chief of these though beets for pickling the popular onion and stored celery for fresh use offer a choice. One or more vegetables suitable for canning for winter use should be included. Corn, tomatoes and peas are the standards for this purpose. Then there are pea-makers for the winter, rhubarb, lettuce in the cellar or Hubbard squash or pumpkin on the shelf offer their services for this purpose.

For the summer months there is the widest range of choice covering all seasons and all types of use. For early use asparagus, winter onions and radish may be considered. For fresh green leaf lettuce can hardly be overlooked, for cooked greens, spinach, Swiss chard, cabbage, Brussels sprouts and others offer a wide selection. For more substantial cooked foods, those already mentioned for winter use and others offer a wide variety. Corn on the cob, ripe tomatoes, melons and other early fall vegetables offer themselves to those who will take the trouble to give them attention. The pickle lover will want some cucumbers, though onions, beets, cauliflower and a dozen others may well be considered. Early peppers and several kinds of herbs offer themselves. The choice therefore is wide and if the quantities grown are kept down, there is no reason why any prairie family should not have all the kinds desired. A half dozen kinds end-on-end in a long row are no harder to grow than the full row of the one kind, and of the short season summer vegetables a very small quantity is all that can be used. A good sized patch of potatoes as the main food vegetable, several long rows of the more popular sorts that are good canners or storeers, then many little parts of rows of the lesser kinds

will offer wide variety, much useful food and will not take up more room or require more labour than can comfortably be spared.

These remarks apply to the farm garden where all is grown for the home table. The gardener who grows to sell must, of course, enlarge to meet the requirements of his customers.

The varieties recommended in this bulletin are in all cases advertised by seedsmen doing business in Manitoba. In some instances other varieties have done as well or even better than these, but as the seed is not conveniently available to western growers, they are not mentioned in this bulletin. For fuller information on varieties, the Annual Reports of the various Prairie Experiment Stations may be obtained free on application to the Publications Branch, Department of Agriculture Ottawa, Ont.

## VEGETABLES GROWN FOR ROOT OR TUBER.

### THE POTATO

The most important of the vegetables grown for their below ground portion is the potato. Potatoes do best in rich soil with a fair proportion of sand. In decided heavy soil they are not as smooth, snappy, or of as good quality. Potatoes respond to applications of barnyard manure, which should be thoroughly mixed in the soil before ploughing the ground for planting. For the farm garden the most practical method of planting potatoes is to plough them in and best results are obtained from ploughing about five or six inches deep with the sets placed about one foot apart in the row. If a furrow about twelve inches wide is turned each third furrow should be planted thus bringing the rows about three feet apart. The sets should be laid along the side of the furrow next to the unploughed land, against the straight vertical edge of the furrow. In this way a straight row is obtained (if the ploughing is as straight as it should be); the sets are better covered and fewer of them are crushed by the horses' feet than is the case when they are placed irregularly in the furrow or on the sole of the ploughed land. Better results are obtained by the use of medium to large seed potatoes than by using small ones. The large ones may be cut to sets of fair size (three or four eyes) with good results. Cutting to small sets or planting only eyes reduces the yield materially. It is best to cut and plant the same day. The important is stressed of using strong, vigorous seed that has not wasted its strength in growing useless sprouts in the cellar.

However, greater earliness and larger yields can be obtained by starting sprouts in such a way that they can be utilised as a start in the growth of the potato plant. This can be done by spreading the seed cut in a single layer in a well lighted cellar or other frost-proof room for six weeks before planting. The vigorous green sprouts started in this way can be handled without breaking off and will bring the potato plant above ground more quickly.

Where potato planters are used the soil should be thoroughly cultivated and brought to a fine tilth by the use of disc harrow or cultivator, and drag harrow before planting. The planter is then operated to place the potatoes in straight rows three feet apart.

An experiment conducted for a number of years at Brandon has shown that earler planting of potatoes than that generally practised gives greatly increased yields. Potatoes planted on May 10 have averaged over 100 bushels per acre higher yield for 1922 and 1923 than those planted on May 23. June

planting gave still lower returns. Good results have been obtained at Brandon from planting as early as May 1. However in some seasons frost injury would follow planting as early as that and planting from May 10 to 15 is recommended.

As soon as the potatoes have been planted trenched in the land should be pressed down with a packer if such an implement is available to firm the soil and break up the surface lumps. This should be followed by harrowing until all remaining lumps are broken. If a packer is available the same purpose can be accomplished by a little more harrowing. Two or three more harrowings from time to time until the young plants have attained a height of three or four inches will help to keep the weeds down and make cultivation easier.

Potatoes should receive thorough cultivation between the rows throughout the season up to the time when the tops impede the progress of the cultivator. In an experiment at Brandon a cultivation as late as August 15 has resulted in an average increased yield for seven years of 47 bushels per acre over the return from three cultivations. In this dry climate potatoes should not be hilled. The ridging is wasteful of moisture. Sunburning is no worse in potatoes grown on the flat than in hills. In fact if hilling is done early and not continually repeated conditions for sunburning are the worst as the early hilling induces high formation of the potatoes and the natural washing down of the earth exposes them.

The Colorado potato beetle commonly called the "potato bug" is the principal insect enemy of the potato. In some seasons serious damage is done by this pest unless prevented by thorough poisoning. Paris green is the commonly used poison for this insect. The Dominion Entomologist recommends eight ounces with an equal amount of lime to forty gallons of water as the proper strength of spray or in some quantities a teaspoonful to a pail of water. Arsenate of lead is now taking the place of Paris green quite extensively and is supposed to be superior on account of being less injurious to the leaves and not so easily washed off by rain. Two pounds of arsenate of lead to forty gallons of water is the recommended proportion or a tablespoonful to a gallon of water. A half pound of soap to the barrel of water will improve the adhesion to the leaves. Combinations of arsenate of lead with the lime under various trade names are now offered by manufacturers. Some of these are satisfactory.

The potato is subject to more varieties of disease than any of the other vegetables grown in Western Canada. The scope of this bulletin will not permit of a discussion of potato diseases. Western Canada suffers less loss from diseases than most potato-growing countries but many are to be found in greater or lesser degree in our crops. This subject is treated fully in various publications by the Dominion Botanist which may be had on request or diseased specimens sent to him at the Central Experimental Farm Ottawa will be diagnosed and treatment outlined.

Potatoes should be dug before the danger of sharp frost in the fall. At Brandon it is considered advisable to dig about September 15. They may be piled temporarily (two weeks) in the field covered with straw and earth. This allows for maturing escape of excess moisture and hardening of the skin. They should be stored in a cool cellar preferably neither too moist nor too dry. The temperature should not go down to freezing as potatoes are easily injured by frost. When stored in large bulk air circulation and provision for escape of foul air from the cellar or pit should be provided.

Potatoes should be packed over during the winter, and especially toward spring, rotten ones removed, and sprouts broken off.

Best results are obtained through the use of two varieties of potatoes. A small patch of an early variety will bring new potatoes into use two weeks earlier than if only the main crop variety is grown. On the other hand the early varieties will not yield as well or keep as well as the later kinds, so the main crop should be of an early late variety. Some of the best early kinds for the home garden are Early Hovoe, Early White Prize, Early Ohio and Beauty of Hebron. If the early potatoes are grown to market the Irish Cobbler is the standard variety and will sell the most readily. It is not the best to grow for home use, however, as it has deep eyes and a tendency to hollowness.

Among the main-crop varieties those included in the Green Mountain group are the best. These are moderately late, very heavy yielding, white, smooth and of good type. Some of the best known of the group are Gold Coin, Wec McGregor, Carman No. 1, Prairie Flower, and Green Mountain.

## BEEF

Beets do best in a rich, loamy soil with enough sand to make it easily worked. However they will succeed reasonably well in most prairie soils. They will make good use of an application of barnyard manure which should be ploughed in. The surface so should be worked into a fine even with free from lumps and perfectly level.

The seed is sown about an inch deep. It is best to sow by hand in a furrow made with a rake or hoe, or if that takes too much labour it may be sown with a Planet Junior or similar hand seeder. The seeds should be dropped from a foot to one inch apart as near as possible and earth firmly pressed over the seed with foot or rake. One course of seed will sow a four row row. As beet seedlings will stand light frosts but not the sharp frosts of early spring, seeding about May 10 gives satisfactory results. The heaviest yields will be obtained from rows about 18 inches apart but where there is plenty of room 2½ to 3 feet apart is recommended.

The first thinning of beets should simply single out the groups that have started together. The plants may be left about a half inch apart till half grown, when a second thinning may be made and the plants pulled at that time used for pickling. Crowding in the row is necessary if the best sizes for pickling are to be obtained for a given patch of room; the plants grow too large and are awkward to handle in cooking. Best results have been obtained at Brandon with plants one inch apart so that if seeding is accurately done thinning may be omitted altogether. Where the soil is not so rich or rainfall is deficient, thinning two to four inches apart may be advisable.

Young beets grown under favourable conditions are ready for use about the first of July. They can be pulled at any time from then until just before fall frost. By storing and pickling the use of beets can be extended over the whole year. Storage should be in a cool cellar not too dry. When they have to be kept in a furnace heated cellar they should be packed in sand to reduce evaporation. Nine beets which are ideal for pickling, may be stored in glass sealers and kept all year. For this purpose those roots under 1½ inches in diameter are best, those pulled in thinning the crop being just right, as they are tender and free from fibre.

Some of the best varieties for the home garden are Detroit Dark Red, Crimson Globe and Dandy. These are firm, smooth varieties of good quality and not too large in size.

## CARROT

The preparation of the soil for carrots is the same as described for beets. The seed should be sown about three-quarters of an inch deep in the same manner as indicated for beets, and firmly pressed in. The rows may be as close



variety test rows of table carrots. Brandon Experimental Farm

stage they are most suitable for canning

Farms on "Canning"

and Garden Gem are also good



## PARSNIP

The preparation of the soil for parsnips is the same as for beets and carrots. The method of seeding is also the same but even more important than in the case of carrots is the need for liberal sowing. Seeding can be as early in the spring as the soil is ready.

Parsnips should be thinned as soon as the second pair of leaves appear. Two inches apart is a good distance in a rich soil with moderate moisture supply.

Parsnips are used only as a winter vegetable. They are better in flavour if not harvested until after a sharp frost. Storage should be in a cool cellar, and if the cellar is dry, packing in sand lessens evaporation. The roots may also be frozen and left in that condition until required, when they should be thawed gradually in cold water, or again a portion of the crop may be allowed to remain in the ground over winter for early spring digging.

## SALSIFY OR OYSTER PLANT

Salsify is grown as a cooking vegetable of the parsnip class and for flavouring soups. It is more branched in its root system and more fibrous than other vegetables of this group, and has a distinctive flavour that is much relished by many.

The method of preparing the soil and of seeding is the same as that already described for other vegetables of this group, save that the seed should be distributed more thinly, as the young plants are difficult to pull in thinning. The plants should be sown or thinned to about one to two inches apart in the row.

Salsify may be used any time after the roots get large enough to be worth pulling but is chiefly used during winter. The method of storage is the same as already described for carrots and beets.

Mammoth Sandwich Island is the variety commonly grown.

## TURNIP

The turnip is about the only common vegetable which is not grown successfully at Brandon Experimental Farm. Not that there is any difficulty in producing turnips. They are very easily raised and a fine-looking crop, but the flavour is bitter and the flesh so fibrous that few will eat them. Similar results are reported from the Morden Experimental Station. However, it is possible that in different circumstances and particularly in cooler districts a better flavour may be obtained.

The preparation of the soil is the same as for others of this group as is also the method of seeding except that wider spacing in the row is advisable. Germination is practically always good and if the seed can be placed one or two inches apart it makes thinning easier. White or yellow turnips for summer use should be left about six inches apart, and swede turnips, about a foot apart. The thinning should be done as soon as the plants are large enough to grasp.

For summer use the true turnip with the rough mustard-like leaf is planted as it grows more quickly than the swede turnip. It should be used as soon as possible after reaching suitable size as the quality rapidly deteriorates. The true turnip is valueless for winter use, for this period and for late summer consumption, the swede (smooth leaved) turnip is the best. These are not so strong in flavour and keep perfectly. They are harvested about the first week of October before heavy frosts come, but light frosts do not affect them. Methods of storage are the same as for carrots.

## ONION

Onions require a strong rich soil and will stand growing in heavy clay better than most kinds of vegetables. They make good use of barnyard manure which should be ploughed under in the fall and require a finer degree of till than other vegetables together with a firm soil. Immediately after the first rutting season possible has been done by the horse labour the soil should be finished off with the hand rake and raked and rolling is not particularly firmly pressed by foot after seeding. The seed is sown about half an inch deep. Rows eighteen inches apart will give good results and under rows may be used. The soil should be sown as soon in the spring as the land is fit to work as they need a long season to reach maturity and are not easily injured by spring frost. The seed should be sown thinly to facilitate thinning which is begun as soon as the plants can be easily grasped by hand leaving the stand with intervals of two inches. Cultivation between the rows and the removal of weeds in the row should be kept up during the season. If by the end of August the tops have not fallen over they should be pulled down with a light barrow to hasten maturity.

The insect most injurious to onions is the onion root maggot. The eggs which produce it are hatched by a smaller fly somewhat smaller than a house fly. The eggs are laid on and about the stems of the young onion plants. In a few days onion maggots hatch and work down into the soil where they lay near the root or burn what is feeding on the sap and soon destroy the onion. The injury occurs throughout the season but is most noticeable in June. There is one certain remedy yet known for it, but one of the most satisfactory is while the plants are dusted along the rows once a week from the time the young plants appear until the onions are well developed. Another remedy which has given satisfactory results in some cases is to mix a quart of an emulsion and sprinkle or sprayed over the growing plants once a week from the time they appear above ground until no further injury is apparent. This emulsion is made by taking one quart of soft soap or one pint of hard soap in a gallon of water. When being added add a pint of crude carbolic acid. Let last for a few minutes and stir thoroughly. When required take one part of this mixture by measure to fifty of water and use as directed above. Where the maggot is troublesome thick setting is less value.

As soon as most of the onions are ripe they should be pulled and spread out on the ground in a single layer to dry off. Covering them at night if there is danger of frost. When they are thoroughly dried the tops are pulled off. Onions are stored in a cool well ventilated place. They are best in shallow boxes or crates so that the air circulates about them. If in heaps or bags they warm up grow and spoil. Onions particularly small ones may be picked for winter use.

The best way to get early onions is to grow them from sets. Sets or Dutch sets, are prematurely ripened little onions, which when planted grow again. They produce earlier onions and usually larger ones than can be grown from seed.

To grow sets, light sandy soil is best and if it is poor and dry so much the better. These conditions cause the ripening of the onion at the tiny size which is wanted. The rows are best about a foot apart and the seed should be sown at the rate of about 200 to the foot. Thin sowing is necessary to keep down the size. The soil should be in fine tilth and very firm so as to get full germination. There must be no thinning. When ripe the sets are pulled, topped and stored as described for early onions. When planted out in the second spring the sets are spaced about two inches apart in rows. The smallest sets, those under a half inch in diameter are much better than larger ones as they grow onions of better quality with fewer thick-necks, and which are better keepers than those produced from the larger.

Danvers Yellow Globe is one of the best varieties of onion for general use. Also Craig, Prietaker Yellow Globe, and Large Red Wethersfield are also good varieties. For pickling, early White Baretta is recommended. For growing sets, Danvers Yellow Globe is most satisfactory.

### RADISH

The seed of radish is sown as early in the spring as the soil is fit to work, in rows as close as twelve inches apart, if economy is desired, or at any greater width. The seed bed preparation is similar to that of other vegetables. The seed should be planted about one-half inch deep and pressed in with the foot, and if dropped one-half to one inch apart will not require thinning. As radishes cannot be kept in storage, the area of any sowing should be small and several sowings made to lengthen the season. While there is a wide choice of varieties varying in shape and colour, there is not much difference in quality.

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## VEGETABLES GROWN FOR THE STEM

In this group come the only perennial vegetables to be considered, viz., asparagus and rhubarb. These should be allotted a permanent location aside from the portion of the garden which is to receive annual ploughing and general cultivation, so as to be out of the way for these operations. They should be in a well sheltered spot where the snow will lie in the winter to protect the roots.

### ASPARAGUS

Asparagus is grown for the tender shoots which are cut off soon after appearing through the ground in the spring. The following directions for propagating and landing asparagus are from a pamphlet on this subject by the Dominion Horticulturist, Mr W T Macoun.

"Asparagus is usually propagated by seeds, although it is possible to propagate it by dividing the crown. This latter method is much less satisfactory than raising plants from seeds, and is not used in commercial planting. Seed should be saved in the autumn from the earliest plants, cleaned and kept dry through the winter and in the spring sown outside in a seed bed. A convenient shaped bed is one about four feet wide. It may be any length desired. The soil in it should be good garden loam and of such a character that it will not bake. Drills are made across the bed about one foot apart and half an inch deep. A little radish seed which will germinate in a few days and mark the rows may be mixed with the asparagus seed as asparagus plants are not easily seen when coming up. The earlier in the spring the seed is sown after the soil is sufficiently dry, the sooner will the seeds germinate and the longer season of growth they will have. As soon as the young seedlings are up, the surface of the ground should be loosened and kept loose throughout the summer to encourage as rapid a growth as possible. The plants should be thinned, if too thick, to from two to three inches apart, and should be fine strong plants by autumn. These are dug the following spring and the best selected for planting. In selecting, those with fewer and stronger buds are chosen in preference to those with more and smaller buds, as the former are likely to produce the thickest stalks. If the plants are bought, it is well to get the best grade of one-year-old plants, although two-year-old plants are also quite satisfactory.



after year will weaken the plants. In this and succeeding years it is desirable to manure in the summer after the last cutting has been made in order that the new growth may get the benefit of the available plant food so as to build up strong crowns for next year. Manuring in late autumn as is often done will keep the soil cooler longer in the spring and delay growth. The manure should be spread between the rows in the summer rather than over the crowns, as the feeding roots run some distance from the crowns."

It is most important that weeds and grass be kept out of the asparagus bed, otherwise its life will be greatly shortened and poorer spandy shoots will be produced.

At Brandon asparagus is ready for use about the first week of May. It is thus the first new product of the season and therefore a delightful change in fare. The shoots are cut when about six inches high. They are cut off just below the ground using a knife and taking care not to injure the crown or other shoots. The cutting off of shoots may be repeated when they appear again but should not be continued late in the season or injury to the plants will result.

Asparagus can be kept for winter use by canning the tips. Tips of uniform length are picked and packed together whole in a glass sealer, and preserved by the methods of sterilization already referred to.

#### RHUBARB

Rhubarb requires a rich soil, the richer it is the better the results. A spot where manure has been piled or any similar extremely rich place is ideal. It is a good idea to summer-fallow the land for the season before the rhubarb is set out. This makes it easier to keep it clean afterwards. If the land is not already very rich, manure may be applied before summer-fallowing, and ploughed in.

Rhubarb may be propagated from seed but as the identity of the variety is likely to be lost through cross breeding in the fertilization of the seed it is better to propagate by transplanting sections of root. A furrow may be opened up with the pough about seven or eight inches deep and the roots poured in it, or individual ones may be dug with a shovel. The plants should be set in squares four feet apart each way. Small sections of root with a single crown are better than large portions for transplanting and should be planted with the crown about level with the surface of the ground, and the earth firmly packed around them. Best results are obtained if the beds are planted in early spring before the roots have produced much new growth. Cultivation with a hoe and scuffle or by hand should be kept up during the first season and the rhubarb will be ready for light use the next year but should not be heavily used until the third season. The rhubarb bed needs digging each spring to freshen the surface and remove any weeds or grass. This last in particular should be kept out, and if any is encroaching, more frequent digging will be found necessary.

Rhubarb is usually ready for use at Brandon by the middle of May. Its use for stewing may be continued throughout the summer, though the quality deteriorates after midsummer and the advent of other garden products lessens the demand.

It may be kept for winter use by preserving in sugar as is done with fruit and may also be forced in the cellar for fresh growth during the winter months, so that a supply of fresh stalks is available from January till spring. A few good sized crowns or pieces cut off the plants in the garden will furnish enough forced stalks for a family. As the crowns or plants from which the stalks are

to be forced have received the necessary nourishment during the season, it is not necessary to plant them in soil in the cellar, although this may be found the most convenient material in which to put the plants, as the roots must be kept moist for best results. The roots are dug just before winter sets in and before being put into the cellar they are left out to freeze solidly. An exposure to frost for from ten days to two weeks is desirable, as roots force more quickly afterwards if they have been frozen. Next the plants are set close together in the cellar, either in boxes or on the floor. They may remain in total or a most total, darkness while being forced as without light the colour of the rhubarb is a very attractive shade of pinkish red. The one lot of plants will continue to throw up stalks for six weeks to two months or until the roots are exhausted, but to ensure a continuous supply some roots may be kept frozen and not put in the warm cellar until stalks from the first lot are ready for use. The temperature in the cellar should not be high, between 50° to 60° F. is a good range and rhubarb will force at even lower temperature, though more slowly.

Victoria and Linnæus are two of the best of the well-known varieties.

### CELERY

Celery is a moisture-loving plant and the provision of this is the chief consideration in choosing soil and location. It is not grown successfully at Brandon Experimental Farm because the natural moisture supply is scanty and no artificial watering is done in the vegetable garden. A soil should be chosen if possible where dry weather will not affect the growth of the celery. Mark ants are very popular for celery growing, although a rich sandy soil will produce better keeping celery if it has the moisture supply. Not only does celery require a good supply of water to make it grow rapidly, but it must also have a liberal supply of plant food. This is best applied by digging rotted manure into the bottom of the trench before planting the celery out in the garden.

Celery seed soon loses its vitality, and it is therefore best to test it for germination before using. The seed is sown in boxes or a hothed as early as the hothed can be started in the spring as the growth is very slow, or it may be started in the house in March. The seed should be barely covered with a sprinkling of soil which should be pressed down. The seed is sown thin as it is better to thin out the little plants to two or three inches apart in the boxes, than to transplant them. Thinning is done as soon as they are large enough to grasp with the fingers. The beds should be watered frequently and the earth kept moist to the surface.

The plants are set out in the garden between June 10 and June 15. A trench about a foot deep and a spade width is dug, well-rotted manure worked into the bottom of the trench and covered with soil. The plants are then set in this trench about six inches apart in a single or double row as preferred. The plants should be shaded until they start growth and water free from alkali applied liberally at this time.

As soon as possible after planting, the ground is cultivated, and thorough cultivation is kept up until the celery is moulded up. It is of the utmost importance to keep the plants in strong growth throughout the season. Shallow cultivation is desirable as the celery is not a deep-rooted plant and it is important not to injure the roots. Furthermore deep cultivation will loosen the soil below many of the roots causing a drying out and thus checking the growth. The importance of keeping the plants growing thriftily may also be emphasized by stating that sometimes when plants are checked in growth during a dry time they will throw up flower stalks, and the celery will be ruined. This applies particularly to early celery. Hollow or pithy stalks are

usually the result of a check in the growth of the plant although it has been found that it is sometimes due to inferior strains of seed.

Celery is blanched to make it crisp and tender and to lessen its strong flavour which is unpleasant in the green stalk. When the plant has formed stalks of sufficient length it is time for blanching. The more part of the roots go over one plant by hand, breaking off suckers and weak outside stalks, then drawing the stalks of the plant together and holding them in position by packing soil about the plant. This operation may be begun when the plants are about six inches high. This preliminary hand labour is done rapidly and



Blanching celery at Southern Experimental Station.

From right to left: (a) Mound soil about the base of the plant. (b) Soil packed and tied for earth banking. (c) Banked with earth.

the rest of the banking is finished with the spade or pug, or both, carefully piling up the soil about the plant, and merely leaving the top leaves and especially the crown or central part of the plant exposed. This mounding up should not be done until the soil is really wet as it would be likely to stick to and discolour the plants.

Early celery is now generally blanching by means of boards, which, while not producing celery of quite so good quality as is obtained by soil gives satisfactory results. Boards are long, thick and of two or three inches in width are most suitable. They are placed in the rows of the rows brought up as close to the plants as possible and are held in place either by stakes or strips of straw or backed across the furrows. A cloth is then thrown up along the base to prevent the dirt getting entrance there. Early celery will blanch within a period of two or three weeks when boards are used. For some use celery may be blanching with good results by using four or five inches of soil over each plant. Celery blanched in this way is not so much of good quality.

The best way to store is to dig about the first of October or before severe frost and place in a dark, cool, well-ventilated cellar which is not wet but yet not too dry. Before storing some of the outer leaves may be removed and the roots washed a little if they are very long. It is not necessary to cover the soil on the roots if the plants are stored immediately after a digging although if there is plenty of storage room it is better left on. The celery should be replanted in soil in the cellar, the roots only being covered with soil. The

plants are set in rows as good air circulation is important, laths may be used for separating the rows with good effect unless there is room to plant them far enough apart for the air to pass readily between. If the cellar is dry and the celery needs wetting during the winter, arrangements should be made for watering without wetting the tops, as wet tops will soon cause rotting.

Rotting of the heart in storage is induced by lack of ventilation, too warm a cellar, and by watering the plants from above. These conditions should be avoided.

### KOHL RABI

Kohl rabi is practically an above-ground turnip, the fleshy portion being an enlargement of the stem. It is preferable to turnip for early summer use as it is milder in flavour. Its season is short and it does not keep, so that the quantity grown should be small. The preparation of the land and handling of the crop are the same as already described for turnips for summer use.

## VEGETABLES GROWN FOR LEAF OR BLOSSOM

### CABBAGE

Cabbage like most other vegetables of which the green leaf is used, must grow rapidly if it is to be of best quality. Rapid growth requires plenty of plant food and a good supply of moisture. Consequently rich soil is needed, heavy soils give good growth of cabbage but when early maturity is desired a sharp, sandy soil will bring the plants more quickly to maturity. The moisture supply can hardly be changed under farm garden conditions but it can be best utilised by giving plenty of room and thorough cultivation.

To insure best results with cabbage it is advisable to start them in a hot-bed, or, lacking a hot-bed, in a bright window in the house. The method of making the hotbed has been described in the introductory portion of this bulletin. The seed should be sown in flats, shallow boxes about twelve by eighteen inches in size and three inches deep. The soil is filled to within one inch of the top, packed firm and given a good watering before seeding. The seed is sprinkled over the surface, pressed in and covered with a sprinkling of fine soil about the thickness of the diameter of the seed. When the second leaf appears, the little plants should be pricked out two inches apart each way in another box. After this transplanting they should be kept from the sun for a day or two. Cabbage plants in the hotbed should get plenty of air, but in providing for this one must avoid frost and cold winds. On fine days for the last two weeks in the hotbed the frames should be taken off to develop sturdy plants. These may be set out in the garden about May 25. A dull, calm day should if possible be chosen for transplanting, and the flats soaked with water so that the soil, which should have considerable humus in it, will stick together around the roots when setting out. Rows may be two and one-half or three feet apart and the plants eighteen inches to two and one-half feet apart in the row, set at such a depth that the first leaves are almost touching the ground. Press the earth thoroughly around the roots. They should be given one good soaking after transplanting, after which no artificial watering is required.

Cabbage may also be grown from outdoor planting, but will not produce as large a crop nor be ready for early use. Following this plan the soil should be manured, ploughed and worked up as described for other vegetables and the



seed planted in rows three feet apart, dropped thinly, as few plants are needed, or cross rows may be marked and the seeds dropped at the intersections. Only one row in three need be planted, if desired, and the others later filled with transplants. The outdoor planting may be done about the first week of May and about two weeks later those of transplanted to from eighteen inches to two feet apart in the rows.

Cabbage should be well cultivated throughout the season, as weeds kept out and any crusting or crusty of the soil corrected by stirring the surface.

When the heads form in dry weather and more abundant moisture comes later trouble with turning heads will be experienced. If the heads are raised a little by hand enough to break some of the roots and reduce the moisture supply it will lessen the loss.

The two most likely to cause damage to cabbage are cutworms, cabbage root maggots and green cabbage worms. The treatment for cutworms has been given in the introductory part of this bulletin. The following in regard to root maggots is quoted from a pamphlet by the Dominion Horticulturist Mr. W. T. Mearns:

Root maggots are often very troublesome. The eggs are laid by a small fly near the stem on the ground, often as soon as the plants are set. In a few days the maggots hatch and burrow below the ground, under the stems or roots, soon causing them so much that the plant is unable to do its work. If it does not become weakened so much that it is useless. Sometimes some of the plants of early cabbage may be saved after being attacked by earthing up the stem when new roots will be thrown out but it is best to prevent the injury. As the eggs are sometimes laid in the field before the plants are transplanted to the field it is desirable to screen the beds with brown cloth to prevent the flies laying the eggs. After planting in the field a good means of protection is a small tar felt paper laid on card about three inches in diameter with a slit for the stem. If the maggots hatch they are prevented from coming into contact with the roots. If the flies are used they must be put on carefully and fit closely to the stem. A few short diverging sticks from the center of the disk permit a close fit. The soil must be leveled about the plant so that the disk will cover it close to the ground. Another and better preventive is a corrosive substance in the proportion of one ounce to ten gallons of water. The plants are watered with this as soon as set out and at intervals of a week or three or four weeks. Corrosive sublimate is extremely poisonous and should be kept in a safe place as should other poisons. Another good preventive is a little osakum a row of the material pressed close around the stem of each plant at the ground when set out. This has a strong odour.

The green cabbage worms which cause so much damage to the cabbage heads come from the white or creamy coloured butterflies which are seen flying about the cabbage patch on hot summer days. The butterfly lays the eggs on the leaves, when the worms hatch out they eat the leaves on the outside first but later work their way farther into the head where they are harder to reach. A good treatment is to use pyrethrum or insect powder. Mix it thoroughly one part by weight of pyrethrum powder with four parts of cheap flour and keep in a covered vessel twenty-four hours then dust or blow with a bellows over the plants. This should be repeated as required. Powdered arsenate of lead in the proportion of a tablespoonful to a gallon of water may be used without danger. The outside leaves are stripped off before use and is a good method of controlling insects. A little soap will make it stick better.

Early varieties of cabbage if started in the hotbed are ready for use at Brandon by Jan. 20 to 23. The same varieties started outside are ready for

use by the middle of August, or a little later. These may be used from the date when the first heads are ready until fall as some heads are later in developing than others. It is best to grow one early and one late or medium variety, the latter will be ready when the early ones are finished and will be suitable for storage, for which the early kinds are useless.

In addition to the ordinary use for boiling, cabbage may be used raw in salads, pickled or preserved in the form of sauerkraut. In storing cabbage heads for home use, they should be left outside for a few days to dry after the outside leaves have been stripped off. Then they may be taken in and laid side by side on the cedar floor, not touching, till further dried, when they may be placed together more closely but not more than three deep, or each may be wrapped up in newspaper and hung by the roots from the cellar ceiling. It is best to have the cellar just above freezing and fairly moist. In a furnace-heated cellar it is a good idea to have the floor sprinkled occasionally for the benefit not only of cabbage but of other vegetables, and apples.

The following varieties are recommended:

Very early Early Jersey Wakefield

Second early Copenhagen Market, Glory of Enghusen

Late Kildonan Fast Swedish, Danish Ballhead

If one variety is grown for all purposes the Copenhagen Market is recommended.

## CAULIFLOWER

Cauliflower is the only commonly-grown vegetable of which the blossom is the edible portion. It belongs to the same species as the cabbage and all that has been said in regard to the culture of cabbage applies to it except that it is more difficult to grow and more subject to accident. It would hardly do to start cauliflower outside in this climate, a hotbed start or similar conditions provided in a dwelling-house are practically essential, except perhaps under especially favourable circumstances.

The treatment of the cauliflower up to the time of heading out is the same as indicated for cabbage started in the hotbed. When the flowers begin to form, they should be protected from the sun by tying the leaves together over them or by laying on green leaves flat. Direct sunlight prevents the formation of good heads.

Cauliflower makes a most delicious boiled vegetable. At Brandon it is ready for use about the last week in July and later-maturing heads keep forming during the next month. It should be used when fresh, or may be pickled. Early Dwarf Erfurt and Earliest of All Snowball are good varieties.

## BRUSSELS SPROUTS

Brussels sprouts is another member of the cabbage-cauliflower group. It is not, however, as desirable as either of the others. It lacks the fine flavour of cauliflower, is not as dependable as cabbage, and its season is short. However, for those who are fond of it, or are interested in trying it out, the same treatment as outlined for growing cabbage, starting with the hotbed, should be followed. When the leaf buds, which are the edible part, develop like small cabbages and become well rounded, they should be pulled off, boiled and served just as early cabbage. The dwarf varieties of Brussels sprouts are most worthy of prize planting.

## LETTUCE

Lettuce is one of the vegetables that no garden should be without. It is easily grown, easily handled and easily prepared for use. The discoveries of recent years in regard to nutrition have shown the great importance of green-leaf vegetables especially when eaten raw and lettuce is undoubtedly chief of these from a practical standpoint.

Lettuce is not especially discriminating in regard to soil but like most crops does best on a rich one. It also requires moisture to get best results. This does not necessarily mean heavy rainfall but plenty of water and good cultivation. The preparation of the soil is not essentially different from that described in general for other vegetables. The surface tillage should be finer than for some other seeds and it may often be desirable to finish the preparation of the seed bed with a hand rake.

A common cause of failure with lettuce is too deep seeding. The seed will not stand burying. One half inch deep is quite enough for lettuce. It may be sown in a shallow fur then covered with a light covering of fine soil and pressed down with roller or foot. Sowings may be as early as the land is fit to work as the plants stand first well. Better germination will result from early seeding and the crop is ready for use sooner. The rows may be placed eighteen inches apart if space is at a premium. A wider horse cultivation is to be used.

As soon as the plants are large enough to grasp they should be thinned to about one inch apart. Later the space should be increased until there are six to eight inches per plant. The most common cause of poor heading of lettuce is overcrowding. To get a fine big head of lettuce with a crisp tender heart plenty of room for development must be given.

Lettuce is comparatively free from insects and diseases. Cutworms may sometimes give trouble. Treatment for these is outlined in the introductory part of this bulletin.

The same end type of lettuce is ready for use at Brandon about the middle of June and the cabbage type about a week later. The season can be lengthened out by a second sowing about June 1.

Good cultivation is a necessity as weeds must be kept out and the soil surface not allowed to crack or form a hard crust.

Lettuce is only good when quite fresh. It is pulled the root removed is washed and serves raw with dressing or taste. It is also the basis of all kinds of tasty salads where it enters into combination with other foods, makes a dainty garnishing for the serving of other dishes and may also be used for bottled greens. Freshness is imperative and winter storage out of the question so that the quantity grown must be small as a few heads go far in serving a family and even the season's product cannot be used except as chicken feed.

There are three types of lettuce in use, the loose leaf the cabbage type and the cos type. The loose-leaf type is the most commonly grown and is a little rarer than the others. It is not nearly so good in quantity as the two types which develop heads. The leaves are exposed to the sun and are much surpassed by the tender blanched leaves which develop in the centre of the head lettuce. Grand Rapids is the standard loose leaf and probably as good as any.

The cabbage type is the most satisfactory for prairie conditions. Some of the best varieties of this type as Crisp and Ice, Denver Market, Iceberg, and Favourite.

The Cos type is seldom seen in the West. The leaves are smooth long and boat shaped forming a long cylindrical head. In favourable seasons it excels all other kinds in tenderness and yield but it is not reliable in poor seasons, especially when drought is the limiting factor. Trianon and Paris White are good Cos varieties.

## SPINACH

Spinach is not discriminating in regard to soil and will grow in practically any kind. Like most vegetables, it does best if the soil is rich and well stored with moisture. The preparation of the soil is along usual methods.

The seed may be sown in rows as close as twelve inches if the saving of space is a consideration, or it may go in the regular wide rows already described. The seed should be sparingly sown, to obviate the necessity of thinning, in a drill about an inch deep and the earth pressed over the seeds.

Spinach is ready for use by the latter part of June. The whole plant, root removed, is used for boiled greens. It is generally considered as the first choice among vegetables for this use, and is especially valuable as a source of iron for the blood. It can be used not only as a fresh vegetable but also may be canned for winter use.

Bloomsdale and Victoria are recommended varieties.

## SWISS CHARD

Swiss Chard is a beet grown for its leaf and stem instead of for its root. The method of growing is identical with that already described for beets, except that in thinning it should be given more room, five or six inches apart is about right.

It is ready for use about July 1 when sown fairly early, and can be used from that time until the stems begin to get fibrous. The whole plant, root removed, is boiled for greens. It can be used only in season and is a heavy yielder, so a small row is sufficient.

## HERBS

Several kinds of aromatic herbs may be grown in the prairie garden and used for flavouring dressings, sausages, etc. Summer savory, broad-leaf sage, and thyme have been grown at Brandon for a number of years and, except for the poor germination of the thyme, have been quite successful.

The preparation of the soil is the same as for other vegetables and the method of seeding as already described for lettuce. Thyme especially should be sown thickly, as the seed is not dependable.

When full grown the plants are picked, washed, the roots cut off, the whole plant dried and later rubbed to a powder and sifted. Home-grown herbs have much more flavour than those which can be bought.

## VEGETABLES GROWN FOR SEED OR POD

## PEA

The green pea is one of the standard vegetables that should be in the first few choices for any garden. When picked at the right stage peas are both nutritious and delicious. They will do best on a fairly sharp sandy loam with plenty of fertility and humus, but reasonably good success can be had on most soils. The preparation of the soil as already described will be satisfactory for peas. They are best sown early, about May 1 and in rows two and a half or three feet apart, about one inch deep and at one inch intervals. If sown carefully they do not require thinning. Short-strawed varieties should be used, as the long-strawed kinds get tossed and broken by the wind and are usually

lighter yields. Cultivation is also simpler when the plants do not fall across the rows. Weeds should be kept out of the rows and the surface of the soil free from cracks or crust by thorough workings.

Peas in Western Canada suffer few attacks from diseases and insects, although cutworms sometimes cause the loss of young plants.

When sown in good time, the early varieties of peas are ready for use by the last of June at Brandon. The length of season is sometimes extended by repeated sowings of an early variety. However, an experiment conducted at Brandon and other experimental farms for a number of years has shown that the use of three or four varieties of varying earliness, all sown at once is a much better plan, giving heavier yield and higher quality in the latter part of the season when the later varieties are superior to the early sorts in quality and yield come into bearing. Fresh peas can by this method of sowing be had at Brandon to the middle of August and later in cooler districts.

The common use of green peas in which the shelled peas are boiled for a vegetable to eat with meals is well known. They are also one of the most satisfactory vegetables to can and in that state are most acceptable during the winter. Home-canned peas can be made much more desirable than the product of the commercial cannery because better varieties can be used and the pods selected when they are in the right condition, not using the whole plant at once or being forced to use a firm variety, as must the canner.

The following are some of the best for use in the home garden. —

Extra Early Best Extra Early, Thos. Loxton.  
Early American Wonder, Gradus, Homesteader.  
Late and Medium Late, Reliance, Strategem Telephone.

This list does not by any means exhaust the good varieties but it will at least suggest some of the good common kinds for the home garden.

The practices are particularly well suited to the growing of seed peas. Where a variety has shown quality in any garden it is a good idea to ripen and save its seed for use the next season.

## BEAN

Beans do best on a fairly sharp soil which will warm up quickly in the spring. Being more sensitive to frost than most vegetables, they should not be planted until the danger of severe frost is past. The seeds also need fairly warm soil for germination. Sowing about May 15 to 20 is satisfactory in a seed bed prepared in the usual manner. The seeds may be sown about two inches deep in rows as close as eighteen inches if necessary or wider where space permits and dropped about two or three inches apart or planted more thickly and thinned to that spacing after the plants are up.

Beans are not particularly troubled with insects, but anthracnose is a disease which has caused considerable damage in the older bean-growing countries and has made its appearance in Western Canada. It is most troublesome in wet seasons, causing unsightly brown spots on leaves, stems, and especially on the pods, which condition makes them unattractive for use and reduces the yield. It spreads by spores which fall on the plants and cause infection, and is not controllable by spraying. The use of home-grown seed from disease-free plants is a good precaution. Bean blight and mosaic also attack beans and cause injury. They are not readily controlled and the best precaution is the use of disease-free seed.

Beans require good cultivation, weeds must be kept down and the surface soil maintained in good tilth if best results are to be obtained.

Beans are grown in the home garden chiefly for the unripe pod, which is boiled for use. Early varieties sown about May 20 are ready for use by the middle of July at Brandon and later varieties at varying dates up to about August 10. These latter will continue to produce fresh pods until nearly the last of August. In shorter-season district, picking dates will, of course, be correspondingly later. As in the case of peas, the sowing of several varieties has been found to be a much more satisfactory means of lengthening the season than repeated sowings of an early variety, though both methods may be used.

Beans may also be ripened to cook for baked beans any time throughout the year. For this purpose the white navy which is grown as a field crop is the best, though the ripe seeds of the varieties used as string beans may also be thus utilized. For ripe beans the method of growing is the same. The beans are allowed to ripen, the vines pulled and left on the ground in small heaps until thoroughly dry, then beaten out with a flail and separated from dust, fragments of straw, and pods by means of a fanning mill.

Green beans may also be canned. The string being removed, the pods are packed whole or in short sections in glass sealers and preserved by sterilization.

Some of the best varieties for green beans are:—

Early, Davis White Wax, Stringless Green Pod.

Later, Wardwell Kidney Wax, Round Pod Kidney Wax.

#### BROAD BEANS

Broad beans differ from ordinary beans in being less frost-tender and will grow in a cool soil, but require a longer season. Consequently, they should be planted as soon as the land is fit to work in the spring. They do best on cool, damp soil. They may also be sown deeper on account of their size, three inches of earth covering not being too much. They require the same cultivation and care as peas or other beans. As soon as a fair number of pods are formed, any new flowers should be pinched off to insure filling of the pods already started.

Broad beans are grown for the large seeds, which are used both green and ripe, and are great favourites with many people. The ripe beans may also be canned for winter use in combination with corn, as succotash.

The Broad Windsor variety is recommended.

#### CORN

Corn can be grown for table use in any farming district in Western Canada if the proper varieties are used. Corn does best on rich, black, warm soil having enough sand in it to make it early. Yet corn will succeed on any of the agricultural land of the West that is used for general crops. It makes good use of manure and a well-rotted dressing ploughed in will increase the yield materially. Corn will succeed with a less particular preparation of the soil than is required for some other vegetables, but responds to good treatment with a more uniform stand. The seed may be planted in hills three feet apart each way or in rows three feet apart with the plants six to nine inches apart in the row. Closer planting reduces the number of mature ears. Three plants to the hill is sufficient, usually about 5 seeds are dropped to allow for loss. The seeds should be planted about two inches deep. Corn is frost-tender and requires heat for germination, so should not go in the ground too early. About May 20 is a good time in most seasons, and later sowing than May 25 shortens the period for development too much. Corn should receive thorough cultivation to keep out all weeds while the plants are growing.

Corn is sometimes affected by corn smut, a disease which destroys the ear, turning it to unsightly black masses. These diseased parts should be burned and if possible seed kept only from non-infected crops.

At Brandon the ear-est varieties of corn are ready for use from August 1 to 10, according to season. From this time until frost comes, varieties of varying earliness can be had coming into season. The use of two or three varieties is the best way to extend the length of the season for green corn.

Corn is prepared for the table by boiling the whole ear when in the early dough state and the grains eaten off the cob. It is also one of the best vegetables for canning. Home-canned corn can be made much more desirable to the taste than the product of the cannery by using a good variety and choosing the ears when in exactly the right state. In canning, the grains are stripped off the cob, and preserved by sterilisation.

In choosing varieties one should select one extra early variety. In cool districts this will be the only kind to reach the usable stage, in earlier districts, such a sort is desirable to bring the season in early. In most parts a second early variety can be used to advantage, and in southern Manitoba at least three varieties can be used to advantage if the family is fond of boiled corn, and there are few indeed who are not.

Pickaninny is the best extra early variety. It is earlier than Squaw and is a sweet corn of high quality. If Pickaninny seed is not readily available, Squaw corn is the next best for extra early use.

For second-early varieties, Early Malcolm, Early White Cory and Peep O'Day are suitable.

For the principal crop, wherever it will reach the proper stage, Golden Bantam is much the best. It has a flavour and quality not approached by any other kind as yet tested. It continues in the right stage longer than other kinds. Later varieties than Golden Bantam are hardly worth growing in Western Canada as they are too uncertain and none approaches it in quality.

## PEPPERS

Peppers are grown for the pod, which is used either green or ripe. They require a hothed start to reach maturity in the prairies. The seed should be sown in flats or boxes as soon as the hothed is ready, or in March in the house. Transplant when the second leaf appears to two inches apart in another box. About June 10 set out in the garden in well prepared soil in rows  $2\frac{1}{2}$  to 3 feet apart, the plants 12 to 18 inches apart in the row.

Seed can also be sown in the open and some green peppers produced, but under Brandon conditions, no ripe ones.

The pods are picked and used for the flavouring of various dishes. They may also be dried and kept for winter use.

## VEGETABLES GROWN FOR FLESHY FRUIT

### CUCUMBER:

There are six or seven members of the gourd family used for vegetables in Western Canada. Of these the cucumber is probably the most widely grown. The plants in this group can use very fertile ground, and manuring will result in increased crop. A warm, sandy soil is better than a heavy, cold one, but it should be as rich as possible. As they send out long vines, they require ample room. They are not hard on the land and can well serve as a

substitute for summer-fallow in the garden. They also require shelter from wind as it is disastrous to have the long vines tossed about. The soil should be worked up into a good state of tilth before planting.

The right planting time is after the ground has begun to warm up and the danger of severe frost is fairly well past. About May 20 to 25 is a good time. At Brandon cucumbers are planted in squares 9 feet apart each way and the method followed is to hollow out a saucer-shaped depression about 2 feet across and about six inches deep with a raised ring around it. The seeds are set about half an inch deep in the bottom of the saucer. This brings them into contact with moisture and protects them from the wind. About eight to twelve seeds are dropped in each saucer and after the plants are up they are reduced to four. The saucers are gradually filled in as the plants grow. By this method sure and quick germination and rapid growth have been secured. The bare soil around the plants should be kept thoroughly cultivated until covered by vines.

The striped cucumber beetle sometimes attacks cucumbers and the other plants of the group. It is a small beetle, yellow and black striped, and attacks the young developing plants. The solution of arsenate of lead and soap used to destroy potato beetles is effective in controlling cucumber beetles.

Cucumbers planted in this way are ready for use at Brandon about the last of July or first of August. The cucumber fruits unevenly in regard to time so that it naturally spreads the season over a long period without special steps being taken to that end.

The cucumber is used green, sliced as a salad. Green cucumbers are also a favourite pickle. Ripe cucumbers also are pickled, and by some are preferred for this purpose.

Among the best varieties are, Davis Perfect, Prolific, Early Fortune

## CITRON

The method of growing citrons is identical with that described for cucumbers. When handled in this way the first fruits are ready for use at Brandon about August 25. Citrons are used preserved in sugar as a fruit. They may be stored raw if sound, unimjured specimens are selected. Placed in a cool dry place they will keep till midwinter or even later.

## SQUASH, PUMPKIN, AND VEGETABLE MARROW

The method of growing squash is identical with that described for cucumber, except that being larger growers, they require more room. At Brandon they are placed in squares twelve feet apart each way, but less distance than this would do where space is at a premium. Squash are used boiled or baked, and hubbard squash may be used for pie-making, being fully equal to pumpkin for this purpose.

The early summer varieties of squash such as crooknecks, custards, etc., are earlier than the hubbard squash but in all other considerations are less valuable. The hubbard squash is superior in flavour and its keeping qualities give it a decided advantage. Good sound hubbard squashes free from damage to the rind, will keep all winter if stored in a cool dry place. The Golden hubbard is earlier than the Green, but the latter is better in quality.

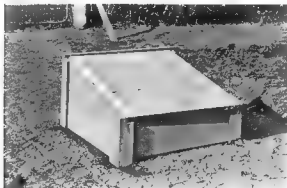
## PUMPKIN

The method of growing pumpkin is identical with that of squash. Pumpkins are ready for use about the last of August. They are used chiefly for





Planted in the open at Brandon muskmelons are ready for use by about September 1. A small patch can be brought through the first fall frosts, if not too severe, by covering the fruits with bags, sheets, etc. Among the best varieties are Emerald Gem, Pau, Rose, Early Knight, and Page Early.



Small frame for forcing melons in the garden.

#### WATERMELONS

Watermelons have not been grown successfully as yet at Brandon, but are grown very satisfactorily at Morden and can be recommended for south-eastern Manitoba. The method of cultivation may be the same as already described for muskmelons. At Morden plants from seed sown in the open on May 15 produced ripe fruit by the first week in September. By starting with a small hotbed as a seed-bed they were ripened by as early as August 20.

The Morden Station recommends the Coe Early for earliness and Peerless and Kleckley Sweet for better quality.

#### TOMATOES

Tomatoes require much heat to reach their best development, consequently they should be given a location that fills this requirement. A well-sheltered spot with a sunny exposure and a sharp, warm, well-drained rich soil furnish the most desirable conditions for tomato growing. A plentiful application of well-rotted barnyard manure ploughed in will add to the fertility and the warmth of the soil.

The growing of ripe tomatoes was considered a rare accomplishment in Western Canada not many years ago, but now at the annual exhibit of the Brandon Horticultural Society the display of ripe tomatoes is one of the most striking features of the show. Probably not all parts of the Prairie Provinces have a long enough season free from frost or with enough heat to ripen tomatoes, but in all the warm sections fruits may be ripened successfully and abundantly if the proper methods are followed.

Tomatoes require a hotbed start in order to have a sufficiently long season. Or if a hotbed can not be had they need to be started in the house in March. However, it is better to have a hotbed as the plants are more easily and successfully started in that way during the long period of protection required before the best planting is made. Tomatoes should be started as early as it is practicable, having a hotbed going that is about 5° to 10° at April 10. The seed should be scattered evenly on the top of the bed pressed in the flats or boxes. The seeds should not be stuck together and should be sown out when that occurs. The soil should be well worked with water before seeding. After seeding a thin covering of fine soil mixed with sand should be spread over watering when enough has settled to keep the seed moist but not to oversaturate. A temperature of about 70° to 80° F. should be maintained in the hotbed for best results. When the seed has appeared the little plants should be picked up about one inch apart in another box.

Later they must be moved again and it does no harm if they are moved three or four times as they increase in size. Finally when they are nearly ready for setting out they must be set six inches each way per plant. Overcrowding causes spindly plants which do not transplant well. Sturdy short well branched plants will transplant best and blossom and set out first. It is best not to water these growing plants when the soil gets tight at night as this may cause damping off. They should get as much ventilation as the weather will permit up to the time that planting approaches and be hardened to a lower temperature than that first required. However exposure to frost or cold winds must be avoided. If new stems up, the sprinkling of dry sand will help to check it.

Tomatoes can not be set out in the open soil, June 10 or so, if it rains as they exist at Branson although some of the warmer districts may be able to get them out earlier with success. This would be best to remain out there feet apart and grow better. The plants can be moved in rows apart in the rows. They are planted deep and if grown in peat or around the roots. A good soaking of water given them after setting and plenty of watering in needed to grow them fresh and plenty of room given.

Before the plants are set out provision should be made for tying them up. Stakes or other material should be driven at the place where each plant will be planted or staking posts set and wires stretched tight up to four feet high along the rows. In some cases such quantities of material are not needed. Western Canada except southeastern Manitoba the tomato plant must be made to grow in an upright position trained to single or double stems and pruned to render this being so. If allowed to grow according to its nature sprawling branch habit it will form a great many green fruits but few will ripen. Repeated experiments at Branson Experiment Farm have demonstrated this fact. The staking and tying have advanced the appearance of ripe fruit from one to three weeks according to season and increased the amount ripened up to the end of August several times over. The separate stake for each plant as given more satisfactory results than the stretched wires although in 1924 when more wires than were used than in any previous year excepting glass and more sandy supplies the results practically equalled those of the stake plants. Plants allowed to develop two stems or more are almost sure to bear a single stem. The plants are tied up as soon as several inches from roots to allow for growth. As they increase in height sometimes they are staked. A soft tying material should be used raffia being the best for this purpose is best. The pruning should remove only the lateral or side branches and the leaves that come out from the main stem. These branches come out in the axils of the leaves and are easily recognized. When the plants reach a height of four or five feet, the top may be

removed and the development of more late fruits prevented. The tying up must be watched throughout the season and if any plants tend to fall over, they should be straightened up and properly secured.

The land between the tomato plants should be kept absolutely clear of weeds so that they may get all the available moisture. Tomatoes handled as thus described, produce the first ripe fruit at Brandon by the fourth week of July in most seasons or in seasons backward ones by the first week of August. Ripening continues until frost comes. Tomatoes will stand a light frost without injury, they are not as tender as beans or cucumbers, but when the afternoon temperature indicates the probability of sharp frost, they should all be picked. Many of the best-developed green ones can be ripened indoors by storing in a cool dark, dry place.

The choicest use of the tomato is as ripe fruit served raw, sliced, as a salad, with dressing to taste. The ripe fruit may also be canned at home for the innumerable well-known uses of the canned tomato, or made into pickles, marmalade, catsups, etc. The green fruit makes one of the best pickles, and indeed, this has been the chief use of the tomato in Western Canada up to the present. With the increased production of ripe fruit easily possible, a much wider usefulness may be expected.

The Alacrité is the best variety available for Western Canada at the present time. This is an improvement on Sparks Earliana and was brought out by the Dominion Horticulturist. The original Sparks Earliana and other strains of Earliana are a good second choice. It is a waste of time for western growers to attempt to produce the late varieties commonly grown in the east and south. It is a good plan for the grower to save seed from fruits that are early and smooth, and thus insure having the kind he wants.

## PUBLICATIONS ON VEGETABLE GROWING

The following publications of the Department of Agriculture relating to vegetable-growing are available on application to the Publications Branch, Department of Agriculture, Ottawa:---

Cabbage and cauliflower culture.. . . .	Pam. 23, E.F.
Garden crops, the manuring of market.. . . .	Bul. 32, S.S., E.F.
Garden on vacant lots and the home vegetable garden.. . . .	Cir. 13, E.F.
Gardening at home and on vacant lots, vegetable.. . . .	Cir. 14, E.F.
Mushroom culture.. . . .	Cir. 45, N.S.
Preservation of fruits and vegetables for home use.. . . .	Bul. 77, N.S.
Vegetables, the cultivation of some staples.. . . .	Pam. 27, E.F.
Bean anthracnose.. . . .	Pam. 25, E.F.
Club-root of turnips and allied plants.. . . .	Ex. Cir. 94.
Corn-boer, the control of the European.. . . .	C.P.L. 15, E.B.
Cutworms and their control.. . . .	C.P.L. 3, E.B.
Cutworm, The Pale Western.. . . .	Pam. 71, N.S.
Cutworms, How to forestall Outbreak.. . . .	Cir. 12, N.S.
Insects and their control, common garden.. . . .	Cir. 8, E.B.
Arsenate of lime.. . . .	C.P.L. 10, E.B.
Potatoes, Black Leg disease of.. . . .	Ex. Cir. 82.
Potatoes, Black Leg disease of.. . . .	F.C. 11, E.F.
Potato Canker (ooid).. . . .	F.C. 3, E.F.
Potato disease, investigation of.. . . .	Bul. 44, E.F.
Potatoes, diseases transmitted by the use of unsound seed.. . . .	F.C. 4, E.F.
Potatoes, Late Blight and Rot of.. . . .	F.C. 10, E.F.
Potatoes, Powdery Scab of.. . . .	F.C. 5, E.F.
Potato Scab.. . . .	Ex. Cir. 44.
Potatoes, spraying for Late Blight and Rot of.. . . .	Ex. Cir. 81.
Root-Maggots and their control.. . . .	C.P.L. 4, E.B.
Root-Maggots and their control.. . . .	Bul. 32, N.S.
Tomato diseases.. . . .	Bul. 54, N.S.





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